The World Bank

Policy Planning and Research Staff

Infrastructure and Urban Development Department

Report INU 37

URBAN PROPERTY TAXATION

Lessons from Brazil

by William Dillinger

April 1989

CASE STUDY

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This report is one of two case studies of property taxation in developing countries recently undertaken by the Urban Development Division (INURD) of the World Bank. (The other on the Philippines has been issued as INU Discussion Paper 16.) Each describes the current practice of property tax administration and attempts to extract lessons relevant to a broad range of developing countries. Lessons from the two cases will be incorporated in a forthcoming report on property tax reform in developing countries.

The principal author is William Dillinger of the Infrastructure and Urban Development Department of the World Bank. Comments and suggestions by Per Ljung and Ricardo Silveira at the World Bank are gratefully acknowledged. Any errors remain the responsibility of the author.

The World Bank

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EXECUTIVE SUMMARY

i. Efforts to increase the responsiveness and accountability of local governments--as well as fiscal constraints at the central level--have prompted an interest in reviving the urban property tax as a major source of municipal revenue. At present, the urban property tax is the most widely used municipal tax instrument in the developing world, but typically accounts for less than half of municipal recurrent revenues.

A. Why Focus on Property Tax Administration?

ii. As is true of any tax, property tax yields can be increased by either increasing tax rates or reducing losses arising from evasion and maladministration. In the case of the property tax, there is a strong argument for beginning with the latter. Efforts to increase rates alone would exaggerate the inequities arising from existing maladministration, placing the burden of the increase on those who already pay their fair share. Improvements in administration place the burden or those who evade. A focus on administration thus achieves two objectives: increasing revenue while improving fairness.

iii. Brazil's experience with urban property taxation yields several generalizable lessons on both the practice of property tax administration and the process of implementing administrative reforms.

B. Improving Administrative Procedures

iv. Brazilian municipalities have found solutions--wholly or partly successful--to several of the common problems confronting property taxation in developing countries.

Problem: Rapid Urban Growth
Solution: Cross-Referencing

v. In a rapidly growing city, a one-time survey of parcels and property characteristics is obsolete as soon as it is completed. Property tax procedures must be capable of discovering and incorporating new construction onto the tax rolls on an ongoing basis. In Brazil, municipalities rely primarily on ongoing field surveys to update property data. Some success has also been achieved with cross-referencing: the use of data provided by other agencies of government to flag changes in the tax base. One form of cross-referencing, the tax clearance, is particularly successful: registrars of deeds will not recognize a transaction unless it is accompanied by a certificate from the assessor, certifying that he has been notified of it.

Problem: Scarcity of Skills
Solution: Mass Valuation

vi. The task of converting visible property characteristics to an estimate of market value is one that potentially requires a sophisticated knowledge of property markets, and leaves considerable discretion to individual property valuers. Local governments in many developing countries have difficulty attracting competent staff for this task, and have found that discretion invites corruption. Brazil has successfully responded to this problem through the widespread use of a highly simplified form of mass appraisal. The technique is based upon a few readily observable, measurable characteristics of each property. No skills, other than the ability to measure and write, are required of the valuer in the field.

Problem: Inaccessible Market Data
Solution: Land Value "Commissions" and Use of Construction Data

vii. Accurate data on market prices is essential to the production of defensible valuations. It is rarely available through official sources. Prices of real estate transactions are frequently understated to avoid real estate transfer taxes. Rental data is often erroneously reported, due to the widespread presence--and evasion--of rent controls. Brazil has an acceptable approach to the calculation of unit costs for buildings: the municipalities use construction cost data, derived from industry sources. Brazil has not found an accurate source of data on land prices, and relies instead upon the options of specially-constituted "valuation commissions."

Problem: Inflation
Solution: Indexation

viii. In any country with significant inflation, existing valuations rapidly become obsolete. The buoyancy of tax revenues cannot be maintained without regularly adjusting valuations and unit costs, or compensatory increases in the nominal tax rate. Brazil has coped with inflation through the widespread use of indexation.

Problem: Disputed Liability
Solution: Broad Legal Definition

ix. Collection enforcement depends upon the ability to identify the person liable for paying the tax. While property is visible and easily defined, tax liability is not. Records of ownership or tenancy agreements may be inaccessible to the taxing authority. In Brazil, liability effectively extends to any person in beneficial occupation of the property. In employing this broad definition, the municipalities are successfully relieved of any legal obligation to prove legal ownership before imposing the tax.

Problem: Slow Judicial Procedures
Solution: Tax Clearances

x. Enforcement also depends upon the government's ability to impose penalties swiftly and consistently. The judicial processes for collecting civil

debts are often slow and expensive in developing countries. In principle, administrative enforcement mechanisms can exploit the government's role as a provider of public services, granter of permits and recorder or guarantor of property ownership to give the taxing authority leverage over delinquent taxpayers. Brazilian municipalities have attempted to use a variety of administrative mechanisms to enforce collections. Only one--a tax clearance for deed registration--is consistently effective, but its use is limited: taxpayers who have no intention of transferring title are unaffected.

C. Making Technical Assistance More Effective

xi. Brazil's experience in implementing improvements in property tax administration on a large scale--exemplified by the federal government's CIATA program--also yields several lessons for the design of technical assistance programs in general.

xii. CIATA is a nation-wide program of technical assistance. It is intended to produce a comprehensive valuation of the tax base, with supporting documentation, in each participating municipality. Within its narrowly-defined objectives, it is highly successful. Three characteristics of CIATA's method of delivery account for its success in delivering technical assistance on a mass scale:

(a) Prepackaging: CIATA is delivered as a standardized package, using identical materials and following essentially the same sequence of steps in each project municipality. As a result, no time is lost developing new materials for each project, and all CIATA procedures and materials are thoroughly field-tested.

(b) Permanent staff: Individual projects are managed by members of a permanent CIATA staff, who are able to draw on experience gained in prior projects.

(c) Collaborative roles for CIATA, local staff: The responsibility of the CIATA project manager is confined to management. He remains on-site throughout project implementation, but all other manpower is provided by the regular assessor's staff and locally-hired interns. As a result of this collaborative division of functions, the assessor's staff "learn by doing" and are able to maintain the system once it is in place.

xiii. While CIATA consistently results in an increase in total valuations, its impact on actual revenues is mixed. Increases in valuations are often offset by reductions in effective tax rates or by declining collection efficiency. Even where tax revenues rise substantially in percentage terms, the absolute level of property taxes remains low. As a result, the costs of administering the tax consume too large a proportion of its yields.

Broadening the Scope

xiv. To an extent, these results reflect CIATA's narrow scope, and could be counteracted by broadening the range of technical assistance offered. CIATA has, in fact, recently added a collection monitoring component in an attempt to forestall declines in collection efficiency.

xv. But it also reflects the political environment confronting the property tax. Local politicians' decisions to reduce effective tax rates or relax collection enforcement are responses to an environment that discourages the effective use of local taxes.

Increasing Project Selectivity, Altering Incentives

xvi. What does this imply for the design of such technical assistance programs? First, it implies a need for greater selectivity in the choice of participating jurisdictions. Some CIATA projects would not have been viable--even from a financial standpoint--under any plausible range of tax rates and collection efficiencies. Such projects could have been identified and excluded through a preproject analysis of the tax base and its administrative cost implications.

xvii. Second, it suggests a need to accompany technically-focused interventions, such as CIATA, with broader policy reform. In Brazil's case, the disincentives for local taxation arise from the vague division of functional responsibilities between levels of government and from the existing system of intergovernmental transfers. Reform should not aim at encouraging local tax effort per se: a high level of local taxation is not an end in itself. But it should aim at removing disincentives to local taxation and providing taxpayers with an unbiased basis on which to judge the case for an increase in local taxation.

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LESSONS FROM BRAZIL

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I. INTRODUCTION

1.01 The property tax is the most widely used municipal tax instrument in the developing world. In most developing countries with large urban populations, some form of property tax is assigned to the support of local governments.

1.02 In principle, it is well suited to the conditions of developing countries:

- Compared to other forms of taxation, it is undemanding in its data requirements. The property tax does not require taxpayers to maintain financial records, but is instead based upon the visible characteristics of property itself.

- It would appear to be difficult to evade, even where government's knowledge of the income or location of taxpayers is limited. Property cannot be hidden (unlike income) and does not move (unlike people and automobiles).

- Finally, it is amenable to enforcement through tax clearances. Government's role as a repository of records on real estate transactions puts it in a position to use the inducement of tenure security to enforce property tax collection, avoiding the lengthy and expensive court processes characteristic of many developing countries.

1.03 In practice, the performance of the property tax is generally unimpressive. In most LDC cities, property taxes lag behind local business taxes and intergovernmental transfers as sources of unrestricted recurrent revenue. Costs of administering the property tax consume a large proportion of its gross yields, leaving little net revenue to finance municipal services.

A. Why Focus on Tax Administration?

1.04 Efforts to increase the responsiveness and accountability of local governments have promoted an interest in reviving the urban property tax as a major source of municipal revenue. Fiscal constraints at the central level have reinforced this trend. Central governments' capacity to finance increasing levels of intergovernmental transfers has declined. Growth in business taxation is constrained by the threat of fiscal competition with higher level of government.

1.05 As is true of any tax, there are two ways to increase property tax yields: one can either increase the tax rate or reduce losses resulting from maladministration. In the case of the property tax, there is a good case for starting with administration.

1.06 First, the losses are often substantial. In many cities, large numbers of properties are missing altogether from the tax rolls, properties on the tax rolls are underassessed and assessments go unpaid due to haphazard collection enforcement.

1.07 Second, the alternative is politically less attractive. Any effort to increase the tax rate on a badly administered base exaggerates inequities in the distribution of the property tax burden, and carries potentially serious political costs.

1.08 Finally, there is a fairness argument: increases in tax rates place the burden of the tax increase on those who already pay. Improvements in administration place the burden on those who evade. Administrative improvements thus increase revenues by improving fairness.

1.09 Brazil is typical of the environment confronting property tax administration in developing countries. Urban growth is rapid, valuation skills are scarce, market data is inaccessible, ownership is disputed and judicial processes are slow. Brazil's efforts to improve the performance of the property tax contain lessons for other countries grappling with similar problems. Two efforts are particularly noteworthy: a high-tech resurveying program undertaken in the municipality of Rio de Janeiro and a nationwide program of technical assistance for local tax administration, termed CIATA.[1/]

1.10 The remainder of this section describes the institutional background of property taxation in Brazil. Section II discusses the features of property tax administration common throughout Brazil. Sections III and IV provide an analysis of the Rio and CIATA cases, respectively, and Section V concludes with a discussion of the generalizable lessons arising from the Brazalian case.

B. Municipal Government in Brazil

1.11 Brazil is big. In terms of land area, it is the fifth largest country in the world. Its population totals about 130 million. In economic terms, it is considered middle income. Per capita GNP is about US$1,800, roughly the same as Mexico and about one-tenth that of the U.S.

1.12 The country is also highly urbanized. Seventy percent of the population--95 million people--live in cities. The urban population is increasing rapidly, averaging an annual increase of about four million people.

1.13 The property tax is assessed and collected by local governments. Local governments in Brazil--termed *municipios*--are one of three levels of government in the country's federal structure. The central government is headquartered in the federal district of Brasilia. The rest of Brazil is divided into 23 states and three territories. The municipalities are geographical subdivisions of the states and number about 4,000. Like counties in the United

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1/ Between 1964 and 1982, mayors of state capitals were appointed by the governors of their respective states.

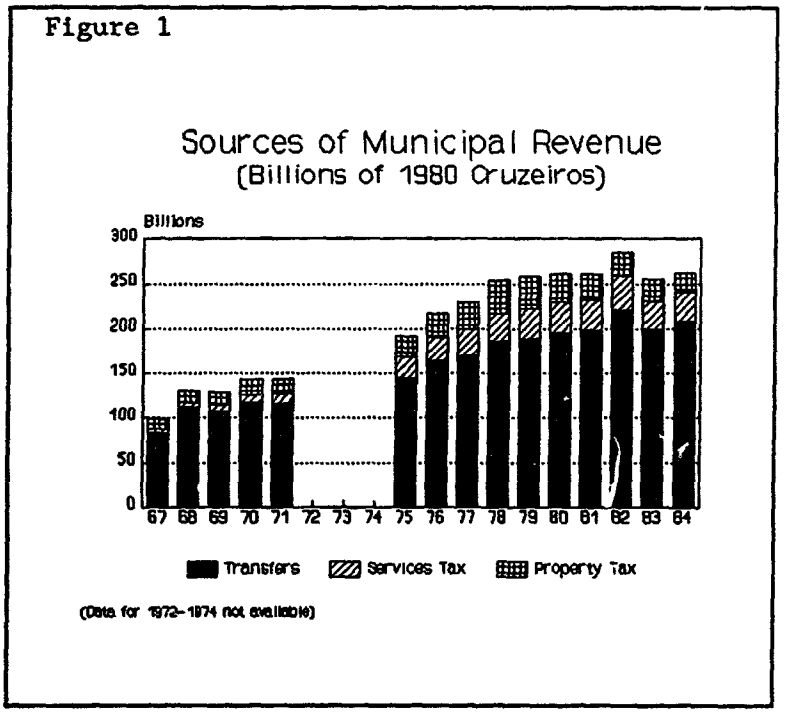
States, the municipalities may include both urban and rural areas. Brazil has no distinct form of urban government.

1.14 By the standards of developing countries, the municipalities enjoy a high degree of autonomy. All have a mayor-council form of government, and both mayor and council are locally elected. Municipalities have the authority to determine the tax rates and administrative procedures of the two tax bases under their control, and can adopt and execute their annual budgets without prior approval of higher levels of government.

1.15 The functional responsibilities of municipalities are not well defined. The large municipalities lost the role they once had in providing water, sewer, and--in some cases, electricity--to urban areas, when state level utilities took over these functions in the 1960s. Public security--police and fire protection--has traditionally been provided by the states. Responsibility for primary education is shared with state governments through a variety of complex arrangements which have produced parallel systems in some municipalities and fluctuating cost-sharing agreements in others. Public health--other than refuse collection--is similarly a joint municipality--state responsibility. Only the collection of refuse and the construction and maintenance of local roads (and related drainage works and street lighting) are unambiguously municipal.

1.16 The revenues of municipal governments are dominated by inter-governmental transfers, as shown in Figure 1. Brazilian municipalities share in the proceeds of 10 taxes collected by the central and state governments, including the principal source of state revenue--a value added tax--and the two principal federal tax instruments--the income and industrial products taxes. Municipalities are also permitted to impose a tax on services, which has proven less politically sensitive than the property tax.

Figure 1



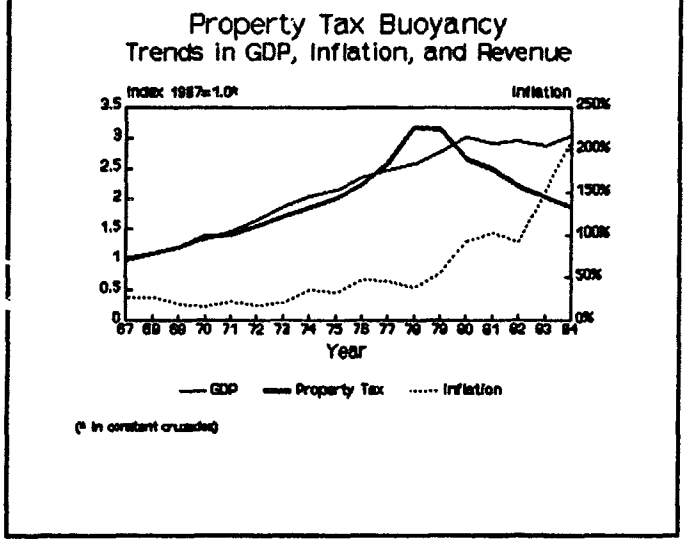
1.17 The ambiguity of municipal functional responsibilities, combined with the availability of alternative, less politically sensitive sources of funds, has undermined political support for property taxation. The property tax is not associated with any major group of services, nor is it perceived as essential to the day-to-day operations of municipal government.

1.18 As a result, the contribution of the property tax to municipal revenues is small. In 1984--the most recent year for which aggregate data are available--property taxes contributed 8 percent of total municipal tax and transfer revenue. The service tax contributed 12 percent. Transfers--chiefly fixed shares of state and federal taxes--contributed the remaining 80 percent.

1.19 The size of this contribution has declined since the present structure of local finance was established in 1967 (see Figure 1). During the 1970s, property tax revenues increased by 250 percent in real terms. Revenues from transfers increased at an equivalent rate, and business taxes, somewhat faster. As a result, the contribution of property taxes to total municipal revenues fluctuated between 10 percent and 15 percent during this period.

1.20 Beginning in 1979, however, property tax revenues began to decline in absolute terms. This downturn corresponded to a period of accelerating inflation and recession in Brazil. As shown in Figure 2, annual inflation began to exceed 50 percent in 1979, and growth in GDP virtually ceased during the first four years of the decade. Property tax revenues--which had closely paralleled GDP growth during the 1970s--declined by 19 percent between 1979 and 1980, and continued to decline steeply during the following four years.

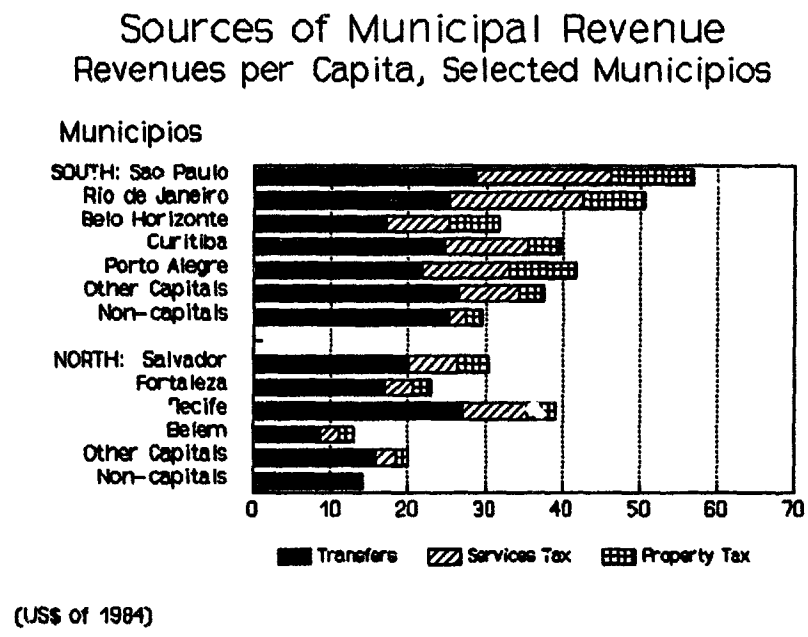
Figure 2



1.21 The importance of the property tax varies widely among municipalities, in both relative and absolute terms. The per capita revenues of selected municipalities are illustrated in Figure 3. The figure divides municipalities between Brazil's two major economic regions: the wealthier south/southeast, and the less industrialized north/northeast. Individual municipality data is provided for Brazil's nine largest cities (all state capitals). Aggregate data is provided for other state capitals and all other municipalities in each region.

1.22 As shown, the property tax makes its largest contribution--in both absolute and relative terms--in Brazil's largest cities. Property tax revenues in Sao Paulo--Brazil's largest city--were equivalent to US$11 in 1984 and provided 20 percent of recurrent revenues in 1984. Yields in other major cities in the south ranged from US$4 to US$9 per capita, and contributed 10 percent to 20 percent of municipal revenues. Yields in major northern cities were lower in absolute terms, but made an equivalent contribution to recurrent municipal revenues, comprising 10-15 percent of the total.

Figure 3



1.23 Outside of major cities, the yield of the property tax was considerably lower; and its contribution less significant. Property tax revenues in the smaller southern capitals averaged US$3 capita; in the smaller northern capitals, US$1.50. Revenues in the noncapital municipalities of the south averaged US$2.10. In the noncapital municipalities of the north, property tax revenues averaged only 22 cents per capita, and contributed only 2 percent of municipal recurrent revenues.

II. URBAN PROPERTY TAX ADMINISTRATION

2.01 Although the municipalities enjoy considerable autonomy in their administration of the property tax, certain characteristics are commonly observed throughout the country. The legal base of the property tax is defined by federal law, and consists of all real property--land and buildings--within the urban zones of a municipalities. The specific boundaries of an urban zone are formally defined by municipal ordinance. To be included in an urban zone, a property must either be currently provided with two of five urban services (sidewalks, water, street lighting, or a public school or health post within three kilometers) or be defined as "urbanizable" on the basis of approved subdivision plans. Certain exemptions (for property owned by government, religious and charitable institutions) are mandated by federal law.

A. Identification of Tax Object

2.02 Most municipalities have, at some time, assembled a parcellary map of the urban areas within their jurisdiction and a set of property records, listing owners of record and property characteristics. The tax maps serve as the basic tool for identifying properties for tax purposes, in the absence of reliable systems of street addresses.

B. Valuation

2.03 Value, for tax purposes, is legally defined as market, or capital, value. Vacant land and common types of residential and commercial structures are valued using mass appraisal techniques.

2.04 Mass appraisal uses a small number of physical characteristics to derive an estimate of a property's value. In Brazil, the mass appraisal process begins with the calculation of standard "unit costs" for land and structures. The cost of land in different neighborhoods is calculated and expressed in terms of a cost per square meter of plot size. The cost of buildings of various types is calculated and expressed in terms of a cost per square meter of floor area. Individual properties are valued by applying these standard unit cost to the respective plot size and floor area of specific properties. Adjustment factors are applied to these valuations to reflect other characteristics--slope or susceptibility to flooding in the case of land, age and condition in the case of structures--which would affect their value.

2.05 The validity of such valuations depends on the accuracy of the unit costs. This is a persistent source of difficulty in Brazil. In industrial countries, unit costs for structures are typically based upon the cost of replacing the structure, less an allowance for depreciation. Replacement costs are based upon current construction prices, derived from industry sources.[2/]

2/ In the U.S., for example, several private firms publish standard construction cost schedules for various classes of buildings.

Unit costs for land are calculated through an analysis of recent sales.[3/] Data on recent sales are provided to the assessor by the registrar of deeds.

2.06 Brazilian municipalities use a similar depreciated replacement cost method to calculate the unit cost of structures. Construction cost data is provided by local contractors or is extrapolated from Brazilian construction industry publications. They have more difficulty estimating the unit cost of land. In principle, information on the price of land transactions would be available from two sources: (i) the registrars of deeds--termed *cartorios*--who record deeds of conveyance, and (ii) the state finance department, which--until the tax was reassigned to the municipal level--administered a tax on the transfer of real property. The prices reported to these official sources are, however, grossly understated in order to minimize property transfer taxes. To address this problem, municipalities generally rely on specially appointed valuation commissions to prepare unit cost tables for land. These commissions are comprised of major landowners and real estate brokers, who are presumed to have access to accurate market information. No specific methodology governs their deliberations, and their results are conceded to be inaccurate, if not deliberately distorted in favor of particular constituencies.

C. Procedures for Updating Assessment Rolls

2.07 The need to discover and incorporate changes in the tax base is particularly acute in Brazil. Due to the country's rapid urban growth rate, the tax base is rapidly changing: new land parcels are created through subdivision and expansion of the "urban zone;" new buildings are constructed and existing ones improved; and changes in ownership occur.

2.08 To discover and incorporate changes in property characteristics, Brazilian municipalities do not rely on regularly scheduled general revaluations. Several parallel strategies are instead used to discover and incorporate the various types of change in the tax base.

Cross-referencing

2.09 As in many industrial countries, Brazilian municipal ordinances call for a system of cross-referencing between agencies of government to assist the assessor in discovering changes in property characteristics. In theory, the public sector, in carrying out its regulatory and judicial functions, is involved in most significant changes in the property tax base. Subdivision proposals must be approved by the municipal public works or planning department. Major construction requires a building permit *ex ante* and an occupancy permit *ex post*. Changes in ownership must be registered by *cartorios*. Cross-referencing should be an effective device for transferring this information to the assessor.

3/ Because sales of vacant land are rare in mature neighborhoods, land prices are often extrapolated from sales of built-upon properties. The value of land in such cases is determined by calculating the cost of the structure (on the basis of depreciated replacement cost) and subtracting it from the gross sales price of the property.

CROSS-REFERENCING PROCEDURES

Action Sought by Taxpayer	From Agency	Flags Change in Tax Base
Approval of subdivision	public works	new land parcel
Building, occupancy permit	public works	new, improved building
Registration of title	cartorio	change in ownership

BOX 1

2.10 Two cross-referencing approaches (summarized in Box 1) are attempted in Brazil. In the first, the cross-referencing agency provides the information directly to the assessor: the department of public works or planning notifies the assessor of recent subdivision approvals and building permits; the *cartorio* provides the assessor with a list of recently registered deeds of conveyance.

2.11 The second approach brings the taxpayer directly into the process. This approach takes advantage of the taxpayer's interest in obtaining an action from the government: a subdivision approval, occupancy permit or title registration. Action is made contingent upon the taxpayer's obtaining a clearance from the assessor, certifying that he has been informed. In this way, information on changes in the property tax base is conveyed directly by the taxpayer to the assessor; the cooperating agency of government acts merely as an enforcement agent.

2.12 Brazil's experience with cross-referencing has been disappointing. Several reasons are cited.

2.13 First, many of the changes in the property tax base occur outside the system of formal permits and registrations. Some are legally outside it: minor building improvements may not require a permit. Many occur in violation of the law: buildings are constructed without permits; land is occupied illegally.

2.14 Second, the cross-referencing agencies are often uncooperative or inefficient. Public works departments and *cartorios* appear to attach low priority to cooperating with the assessor. Rio's *cartorios*, for example, are three years behind in providing the names of new property owners to the assessor.

2.15 Of the two cross-referencing approaches, the second--where the taxpayer is directly involved--is the more consistently successful. It is particularly successful in two cases: (i) when imposed by the public works department as a condition of granting an occupancy permit; and (ii) when imposed by the cartorio as a condition of registering a deed of sale. The former case serves to bring new construction to the assessor's attention; the latter, to flag changes in ownership, including the sale of recently subdivided parcels.

Voluntary Compliance

2.16 Taxpayers may also be induced to voluntarily supply information directly to the assessor, particularly where it involves changes in ownership. Because property ownership in Brazil is subject to dispute, purchasers will often register their property with the assessor in an attempt to strengthen their claim.[4/] Registration on the property tax rolls does not legally constitute a recognition by government of a taxpayer's claim, but in the absence of contrary evidence, it is often accepted as such by the courts. In order to avoid liability for property they no longer own, sellers of property may also notify the assessor of a change in ownership.

2.17 Experience with voluntary compliance is mixed. In Recife, the assessor reports a high degree of compliance among property owners with particularly dubious claims. In towns where absentee ownership of vacant urban land is widespread, assessors report great difficulty in determining ownership, and little cooperation on the part of property owners.

2.18 Cross-referencing and voluntary compliance do not eliminate the need for site visits and additional investigation. Proposed subdivisions or new construction--although approved by the public works department--may never take place, and therefore have to be verified. Subdivision plans and building permit applications may not provide sufficient information to permit an in-office valuation. Voluntary compliance is only effective in bringing changes in ownership to the assessor's attention. As a result, cross-referencing--even where it works--serves only a limited function: that of bringing changes in the tax base to the assessor's attention.

Ongoing Field Surveys

2.19 To supplement these indirect means of discovering changes in the tax base, assessors rely extensively on field work by their own staff. Staff of the assessors office--termed *fiscais*--regularly patrol designated zones of the

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4/ This problem has deep historical roots. Present claims to property ownership descend, in principle, from grants made by the Portuguese king in the sixteenth century. As these grants were contingent upon the productive use of property, the colonial authorities rarely objected when new settlers took over parcels of unused land for their own use, regardless of whether the land had already been granted to someone else. By the mid-eighteenth century, overlapping claims were widespread. Shortly after independence (1822), laws were enacted to enable squatters to legalize their claims, but these opportunities were not widely exploited. New disputes over land ownership have emerged in the wake of Brazil's urbanization. Low-income households, unable to obtain urban land legally, often resort to illegal occupation on public or private land.

Brazil's private deeds registrars--the cartorios--record claims to property. Deeds, of course, are merely evidence that a particular transaction has taken place, and do not constitute proof of legal ownership. Property descriptions contained on deeds are also often unclear, and are not supported by monumentation on the ground, giving rise to disputes over boundaries.

municipalities, noting new construction and evidence of impending subdivisions and sales.

General Revaluations

2.20 Over time, the occasional failures of these maintenance procedures result in the accumulation of a significant number of omissions. All municipalities are therefore forced to eventually undertake general resurveys. In most industrial countries, general resurveys are carried out at periodic intervals. These resurveys are normally comprehensive: an effort is made to physically inspect each property and verify the information contained on its corresponding property record.

2.21 In Brazil, general resurveys are neither periodic nor comprehensive. No municipality attempts to follow a predetermined schedule for resurveying properties. The scope of such resurveys, when they occur, is often highly selective. Some municipalities survey only the zone of urban expansion, making no effort to verify ownership and property characteristics in neighborhoods already on the tax rolls. Resurveys may be further limited to higher-income neighborhoods or to classes of property on which major increases in revenue are expected.

D. Inflation Adjustments

2.22 Municipalities have two means of adjusting the level of the property tax in their jurisdictions. They may either adjust the nominal tax rate, or they may make an across-the-board adjustment in property assessments. The latter is far more widely used, and has been crucial to the viability of the property tax.

2.23 Brazil has experienced high rates of inflation during most of the twentieth century. In the 25 years between 1962 and 1987, annual inflation averaged 65 percent, a cumulative total of 286,000 percent. In the first seven years of the 1980s, annual inflation has averaged 160 percent. To maintain the buoyancy of tax revenues, Brazilian municipalities index valuations.

2.24 Federal law gives the municipalities considerable latitude in this regard. Municipalities are permitted to make annual increases in valuations, at a uniform percentage rate, without physical inspection of individual properties, provided the adjustment is approved by the municipal council as a whole. Mayors may make these adjustments unilaterally, provided the percentage increase does not exceed the official inflation index for treasury bonds.

2.25 These adjustments apply both to existing valuations and to the unit costs used to value new construction. As a result, new construction and existing construction are valued at consistent prices. Because the adjustments are not based upon actual price changes in the real estate market, the assessed values and actual market values tend to diverge. Particularly during periods of hyperinflation, adjustments lag actual inflation in market prices, resulting in a gradual decline in assessed values in real terms.

E. Tax Rates and Exemption Policies

2.26 Municipalities use nominal tax rates and exemption policies to pursue a variety of policy objectives. Vacant land is generally taxed at a higher rate than developed property in an effort to discourage land speculation. Recife, for example, imposes a 1 percent rate on developed property (both the structure and land components), but taxes vacant land at 3 percent.

2.27 Rio uses the tax structure to pursue both land use and distributional objectives. The tax structure on vacant land is differentiated by socioeconomic zone and lot size: small lots in the city's poorer northern zone are subject to a rate of 0.5 percent. Large lots in the southern part of the city are subject to rates as high as 7 percent. Rio's rates on developed property are differentiated by floor area: the smallest category of residential structure is subject to a tax rate of 0.6 percent; the largest, 1.2 percent.

2.28 Both Rio and Recife exempt certain classes of small residential properties, in an attempt to achieve distributional objectives. In Rio, the exemption is based upon a property's tax liability: residential properties with a tax liability of less than 0.2 "standard units" [5/] are exempted. Recife bases its exemption on a more complex set of conditions: the property must have a floor area of less than 50 meter square, it must be owner-occupied, it must be the owner's only property, and the owner's monthly income must not exceed four standard units.[6/] Both Rio and Recife have a de facto policy of exempting properties in squatter settlements.

2.29 Given the low absolute level of property taxation in Brazil, it is unlikely that these rate and exemption policies achieve their intended impacts on land use or income distribution to any siginificant degree.

F. Billing and Collection

2.30 Liability for the property tax rests with the owner of the property. "Ownership" is broadly defined and extends to any person in beneficial occupation of the property in question. The municipality is thus relieved of the legal obligation to demonstrate ownership--in the sense of documents registered with the cartorio--before imposing the tax.

2.31 The municipal treasurer is responsible for the production and delivery of tax bills. Bills are generally printed and delivered in the first quarter

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5/ The standard unit--termed UNIF in Rio--is a reference value, fixed by the municipio. It is expressed as a multiple of the price of national treasury bond, the OTN. The price of an OTN, in terms of cruzados, is regularly adjusted to compensate for inflation. In October 1987 Rio's UNIF was fixed at 2.34 OTNs, and was equivalent to Cz 999.65 or US$19.50.

6/ Recife's standard unit was fixed at 3.5 OTNs, as of October 1987. Recife's income ceiling was therefore equivalent to US$116. This is about twice the minimum wage.

of the tax year. Where a property is occupied solely by tenants, the delivery of the bills to one tenant constitutes notification.

2.32 Most municipalities allow the taxpayer the option of paying the tax as a single payment or in a series of installments. Inflation can, of course, quickly reduce real value of payments made late in the year. To discourage installment payments, municipalities offer incentives to taxpayers paying in full at the beginning of the tax year.

2.33 Some also increase the assessments on installment payments to reflect ongoing inflation. The mechanics of doing so are complicated. Brazilian inflation, while always high, is also unstable. In the years 1985, 1986 and 1987, for example, annual inflation totaled 235 percent, 76 percent and 390 percent, respectively. Municipalities are thus in a poor position to forecast the level of inflation before the tax year begins. Some municipalities address this problem by billing twice a year, and adjusting the second payment to reflect inflation during the first six months. Others require taxpayers to adjust their own tax assessments, using an official index published in the newspaper.

2.34 Bills are generally paid in person. For the convenience of taxpayers, payments may be made at the branches of designated private banks. These banks are compensated by permitting them the use of tax funds, interest-free, for five days.

G. Enforcement

2.35 Municipal ordinances provide for stiff financial penalties for late payment. Bills not paid by their due date are typically subject to a 15-20 percent fine. Both the tax bill and the fine are subject to monthly interest charges of 1 percent, and the bill, the fine and the interest charges are all subject to inflation indexing. Any taxpayer with an outstanding balance at the end of the tax year is designated a general debtor of the municipality, and is subject to prosecution through the civil courts.

2.36 Legal prosecution, however, takes a long time. Recife's treasurer estimates that the period between the initial designation of a delinquent account and the final judgement by the courts averages five years. The costs to the municipality of legal representation are also high. Municipalities thus tend to negotiate out-of-court settlements with delinquent taxpayers, rather than pursuing cases to their ultimate conclusion. The willingness of municipalities to negotiate contributes to poor collection efficiency. Estimates of collection efficiency on current account range from 40 percent to 60 percent. (Figures on the proportion of arrears that are eventually collected are not available.)

2.37 In principle, municipalities could also use a number of administrative procedures to enforce collection. The clearance procedures used to flag changes in property characteristics can also be used to enforce payment. Property owners may be required to obtain a property tax clearance in order to apply for a subdivision approval, a building or occupancy permit, or to register a deed of sale. Only the last of these has been used with much consistency, and its usefulness is limited. Taxpayers who have no intention of selling their property are not affected by it.

III. THE RIO CASE

3.01 There have been several recent efforts to improve the performance of the property tax in Brazil. Some have been prompted by immediate fiscal crises; others by the persistence of low absolute levels of revenue. Their experience is relevant to efforts to improve property tax performance in other countries.

3.02 The lessons provided by their experiences are of two types:

- those arising from the specific technical or procedural innovation introduced under the reforms; and
- those concerned with the process of reform itself: the scope of reform, manpower and organizational aspects, and costs.

3.03 Rio's recent property tax reform illustrates the use of sophisticated technology to lower the labor costs and speed the implementation of a major resurveying effort.

3.04 The Rio reform was prompted by an immediate fiscal crisis. As a major center of Brazilian manufacturing, Rio was profoundly affected by the recession of the early 1980. The recurrent revenues of municipality declined by one third--in real terms between 1979 and 1983. Property tax revenues dropped by 40 percent. Recurrent expenditure proved less flexible, due in part to the irreducibility of expenditure on primary education.[1/] As a result, recurrent expenditure declined by only 12 percent between 1979 and 1983. By 1983, Rio was running a current account deficit equal to 8 percent of recurrent revenue.

3.05 The municipality's response was to make a major attempt to increase revenues. Its options were limited. In 1983, roughly 40 percent of recurrent revenues were derived from intergovernmental transfers, a source outside the municipality's control. Effort was instead focused on the property tax.

3.06 Rio's property tax reform had two components: (i) a major resurveying effort aimed at discovering and incorporating recent construction onto the tax rolls; and (ii) an increase in valuations, based initially on a steep increase in the annual inflation adjustment, and subsequently the introduction of new unit cost factors.

3.07 Prior to 1984, Rio's most recent general resurvey of property had been carried out in 1975. Products of the survey included orthographically corrected maps of the entire urbanized area and comprehensive property tax records. Subsequent maintenance, however, was haphazard. Preliminary surveys conducted in 1984 indicated that 60,000 recently constructed buildings were missing from the tax rolls. Undiscovered changes in use--which affect the tax

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1/ Unlike most Brazilian municipalities, Rio bears exclusive responsibility for expenditure on primary education, a legacy of its former status as the capital of Brazil.

rate--were estimated to be costing the municipality an amount equal to 30 percent of current revenues.

3.08 Valuations, meanwhile, were falling increasingly behind market values. The valuations made in the 1975 general resurvey were based upon market data originally gathered in 1966, adjusted for inflation. As the rate of inflation increased in the early 1980s, subsequent adjustments in values failed to keep pace. Between 1984 and 1987, inflation totalled 2,900 percent. Adjustments to unit costs were less than half that.

3.09 Distortions were also introduced in the distribution of the tax burden across neighborhoods. In 1983, the municipality began to differentiate the annual increases by zone and building size, in an attempt to reduce the tax burden on lower-income households. Expecting an inflation rate of 200 percent, the municipality capped the increase on small residential buildings in the north zone at 50 percent. Assessments on large residences along the southern beachfront were permitted to increase by 280 percent. As a result, by 1987 the tax base not only grossly underestimated property values, but also no longer even reflected the relative prices of properties in different locations.

A. Resurvey

3.10 The task of resurveying Rio was assigned to the *Instituto de Planejamento Municipal (IPLAN)*. IPLAN is a municipally-owned parastatal, which assumed the task of maintaining Rio's property tax cadastre in 1986.

3.11 From the outset, the scope of the resurvey was limited to those areas and classes of property where it was expected to be most cost effective. Geographically, its coverage was confined to higher-income neighborhoods. The entire northern zone of the city--a low-income area encompassing 22 percent of taxable properties but only 3 percent of the city's assessed value--was excluded. Favelas--squatter settlements in higher-income areas--were also explicitly exempted. Vacant land was also not surveyed: no attempt was made to ascertain changes in parcel boundaries due to subdivision or consolidation. IPLAN anticipated that the greatest increase in assessments would arise from the discovery of new construction and changes in building use. Thus the program focused exclusively on built-upon properties.

3.12 The program was carried out in three phases. First, the entire assessment zone was aerially-photographed. To minimize costs, the resulting photomosaic was not orthographically rectified and transformed into line maps. Instead, sections of the unrectified photomosaic itself were carried into the field and used as base maps. In the field, survey teams sought only three items of information for each building shown on the photomosaic: its street address, number of floors and its current use. No attempt was made to measure the physical dimensions of the buildings or to determine their owners.

3.13 Building dimensions were determined at the IPLAN offices on the basis of the aerial photographs. The ground-floor perimeter of each building was

digitized and converted to a uniform scale using a microcomputer.[8/] Based on the corrected perimeter dimensions, a computer program then calculated the ground-floor area of each building. The total area of multi-story buildings was calculated by multiplying the ground floor area by the number of floors, as determined during the field survey.

3.14 Data from the field survey and floor area calculations were then merged and compared with the property records currently in use by the assessor. This revealed two categories of discrepancies: (i) unrecorded expansions--or changes in use--of buildings already on the assessment rolls, and (ii) newly constructed buildings absent from the assessment rolls. In the former case, the revised data was used to calculate a new assessment without further field investigation. IPLAN assumed that all other information on the property record--the construction characteristics used for valuation, the ownership data used for billing--i.e., was correct.

3.15 In the case of newly constructed buildings, the property record information had to be acquired.[9/] IPLAN initially attempted to obtain this information through the mail: letters requesting data on ownership and building characteristics were mailed to the 60,000 new buildings discovered by the program. Only 12,000 responses were received, of which only 8,400 were usable. IPLAN now intends to follow up with a more stridently worded mailing and will provide property owners with assistance in filling out data sheets through the branch offices of the municipal governments. Where this fails, IPLAN will be forced to send a staff person to collect the required data.

B. Valuation Reforms

3.16 IPLAN began work on a new calculation of unit costs in 1986. Uniquely among Brazilian municipalities, Rio does not value land and buildings separately when valuing built-upon property. Instead, a single factor--value per square meter of built area--or "Vu" is calculated for each neighborhood. Individual valuations are derived by multiplying the floor area of a building by the Vu for its neighborhood and applying three adjustment factors to reflect the building's age, its position on its lot and the relative desirability of its location within the neighborhood.

3.17 To calculate new Vu's, IPLAN surveyed a sample of 1,200 properties currently on the market. (As in the rest of Brazil, official data on the price of actual transactions was assumed to be unreliable.) In middle- and higher-income areas, price information was taken from newspaper advertisements. Follow-

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8/ The scale of aerial photographs will vary as the altitude of the plane and the elevation of the terrain being photographed change. Standard micro-computer software was used to transform the digitized data to a homogeneous scale. This process also requires the input of control points at known distances from each other. In the Rio revaluation, control points were derived from orthographically rectified maps prepared during the 1975 general revaluation.

9/ The construction of a new building on formerly vacant land was assumed to imply a change in ownership.

up calls were made to determine the square footage of the properties advertised. Properties in low-come areas are generally not advertised in newspapers. In these areas, price and floor area information was obtained through interviews with the patrons of local bars and bakeries. Individual Vu's were then calculated for each sampled property.

3.18 The weights assigned to the adjustment factors were determined arbitrarily, although they can dramatically affect assessments. A building's position at the back of its lot can reduce its assessment by 50 percent; location in a desirable part of the neighborhood can double an assessment. No effort was made to determine the market's assessment of the contribution of these factors to property values.

C. Impact and Cost Effectiveness

3.19 IPLAN expects the impact of the reform to begin to appear in the property tax receipts of 1988. Two of the components of the resurvey will be incorporated in the 1988 billings: changes in use and revisions to the dimensions of buildings already on the tax rolls. Newly discovered buildings will not be billed in 1988. As noted earlier, property records for these buildings are not yet complete.

3.20 Revised unit costs will not be introduced until 1989. For 1988, the municipality has announced that annual adjustment on existing valuation will range from 220 percent to 348 percent for residential property and from 220 percent to 444 percent for commercial property.[10/] Nominal tax rates are to be consolidated to a single rate (on improved property) of 0.8 percent.

3.21 The resurvey component of the program has to date cost the equivalent of US$670,000, an average of 95 cents per property. Total program costs were equivalent to 1 percent of property tax revenues in the year preceding the program. Viewing the program as a financial investment, IPLAN regards the program as highly cost-effective. IPLAN reports that one component alone--revisions to the records of buildings already on the tax rolls--increased total billings by about US$15 million, an amount equal to 22 times the program's cost.

3.22 This apparently high degree of cost effectiveness is attributable in part to the programs's narrow scope. In excluding low-income areas, it avoided properties where the ratio of administrative costs to yields would be relatively high. In making no attempt to discover changes in parcel dimensions, it eliminated any need to contact owners or investigate subdivision records or deeds registrations.

3.23 Costs were also reduced by the program's minimal reliance on original field data gathering. By avoiding any effort to verify ownership, measure building dimensions or note construction details, the field survey phase of the program was able to average 55 buildings per field staff per day.

10/ Inflation adjustments will continue to be differentiated by neighborhood.

3.24 These cost-cutting measures have some adverse consequences. Existing omissions and distortions in the assessment rolls of low-income areas will clearly go uncorrected. Missing vacant land parcels throughout the city will continue to be undiscovered. The program's reliance on mailings to obtain data on new buildings has not succeeded; follow-up efforts will increase the program's ultimate cost. Its failure to verify ownership on existing built-upon properties may result in later collection problems.

Table 1: PROGRAM COSTS BY COMPONENTS
(US$ '000)

Item	Costs
Item	
Personnel	275
Aerial photography	166
Digitizer	140
Use of online computer	40
Transport (rented cars)	35
Misc. equipment	14
TOTAL	670

3.25 The cost-effectiveness of the program's technology choice is fairly clear. Although equipment expenditures total 40 percent of total program costs, the resulting savings in labor costs appear to be substantial. The use of a digitizer and computer to correct scale distortions and calculate floor areas permitted IPLAN to complete the measurement of an average of 300 buildings per staff per day. IPLAN estimates that the equivalent rate using manual techniques would be about 20 buildings per staff day. At an average daily wage of about US$9, the total costs (including both equipment and staff) of this phase of the program would have been about 50 percent higher using manual technology.

3.26 IPLAN's reliance on temporary employees--interns--also reduced costs. As shown in Table 2, interns accounted for roughly 90 percent of the 116 staff years consumed by the program and were involved in every phase except the initial

aerial photography (which was contracted out). The use of interns permitted IPLAN to maintain relatively low wage costs--the program's total wage bill averaged US$200 per staff month--while maintaining the flexibility to release staff when the program was finished.

Table 2: STAFF ALLOCATION
(Man-Years)

Program Phase	IPLAN Staff	Interns
Gather field data	7.5	52.5
Enter field data on computer	2.5	13.2
Digitize aerial photo data	2.4	11.5
Investigate, fix discrepancies	2.0	24.0
Produce final list	0.5	na

IV. PROJECT CIATA

4.01 CIATA, a second major effort at property tax reform, differs from the Rio case in several respects. First, it is a program involving a large number of municipalities rather than a one-time effort in a single city. Second, it is administered by the federal government. Third, it is primarily aimed at smaller jurisdictions.

4.02 Like the Rio case, CIATA contains some technical and procedural innovations that might be applied in other countries: the use of simple identification and valuation techn'ques, and the use of computers in small jurisdictions. CIATA's more important lessons lie in the design and execution of technical assistance programs, particularly in the use of standardized packages of technical assistance to reach large numbers of jurisdictions at low cost.

4.03 The CIATA program was initiated by the Federal Government in 1973. It was largely a response to persistent low tax revenues in smaller municipalities, particularly those in the Northeast.

4.04 The Federal Government attributed these low yields to problems in municipal tax laws and weaknesses in local tax administration. The legal definition of value was inconsistent with the methodology used to derive it. Properties were missing from the tax rolls. Valuations were arbitrary. Procedures for monitoring collections were ineffective.

4.05 The Government's response was to establish a major program of technical assistance, termed CIATA.[11/] CIATA consists essentially of a standardized package of technical assistance executed over a 1-year period in a designated group of municipalities. Within each municipality, the program produces:

(a) a new tax code;

(b) a new fiscal cadastre--incorporating revised maps, new property records, a new table of unit costs and revised assessments on all properties--and

(c) a set of billing records (the tax roll and individual tax bills) to be used in the first year following the project.

4.06 Since 1973, CIATA projects have been completed in 1,282 municipalities. As shown in Table 3, the program has averaged about 100 projects per year. Most have been small. The number of property units per project has averaged 6,440.

11/ Convenio de Incentivo ao Aperfecicoamento Tecnico-Administrativo das Municipalidades.

Table 3: CIATA PROJECTS 1973-85

Year	Projects	Average Units per Project
1973	9	4,517
1974	11	5,572
1975/76	49	6,759
1977	81	8,945
1978	128	9,726
1979	193	7,113
1980	106	7,176
1981	163	3,682
1982/83	214	3,409
1984	174	3,588
1985	152	11,480
TOTAL	1,282	8,256,251
Average	99	6,440

A. Organization

4.07 The program is administered by the *Secretaria de Economia e Financas, (SEF)* a unit of the Federal Ministry of Finance. SEF's role is limited to overall program management and the provision of financing. Field supervision of individual projects is carried out by a permanent CIATA team working in SERPRO, the federal government's data-processing parastatal. SERPRO provides this service on a contract basis to SEF.

4.08 Individual subprojects draw on five categories of inputs:

(a) the project supervisor, assigned by SERPRO, who remains on-site throughout project implementation;

(b) temporary staff (used in field data collection) surveying, cartography, and the preparation of forms for data processing;

(c) materials and equipment, including forms and equipment for surveying and mapping;

(d) data processing services, including entry of field data onto computer files, calculation of assessments, production of tax rolls, and printing of tax bills; and

(e) in-kind contributions by the municipality, including the use of office space and the services of the local assessor and his staff.

4.09 The number of inputs that SEF is willing to finance has diminished as the program has matured. As shown in Table 4, CIATA originally financed all project inputs except in-kind contributions by the municipality. Beginning in 1976, SEF shifted the costs of data processing to the states and municipalities (as mutually agreed on an individual project basis). In 1981, SEF also ceased to finance the cost of temporary staff. At present, the program therefore finances only the costs of the project supervisor, and materials and equipment. Costs of temporary staff are borne by the municipality; costs of data processing, by the state or municipality. All SEF-financed inputs are financed on a grant basis.

Table 4: FINANCING OF PROJECT INPUTS/a

INPUT	1973-75	1976-80	1981-87
Supervisor	SEF	SEF	SEF
Temporary Staff	SEF	SEF	MUN
Materials and Equipment	SEF	MUN/STATE	MUN/STATE
Data Processing	SEF	MUN/STATE	MUN/STATE
Office, Local Assessor	MUN	MUN	MUN

/a Agency providing funding for project inputs:
SEF: *Secretaria de Economia e Financas* (Federal Government);
MUN: Municipalities;
STATE: State Government.

B. Sequence

4.10 With a given municipality, the CIATA process is comprised of eight principal steps.

Nomination

4.11 Candidates for inclusion in the program are initially nominated by their respective state governments under guidelines fixed by SEF. A final list of nominees is then agreed upon in discussions between SEF and the state government.

Contracting

4.12 Two acts are then required of the municipal government before its formal inclusion in the project. First, the municipal council must enact--and the mayor execute--a revised municipal tax code based upon a model provided under the program. Second, the council must approve--and the mayor sign--a project agreement with its respective state government and SEF. The project agreement specifies the municipality's obligations with respect to the provision of financial and in-kind contributions to the project, the administrative relationships between the project and the various agencies of the municipal government, and any specific procedural reforms that might be required as a condition of inclusion in the project.

Mobilization

4.13 Mobilization begins with the arrival of the SERPRO supervisor on site. The supervisor then recruits temporary staff, organizes office space and procures materials and equipment. The temporary staff used in the project are normally hired locally and given a 5-day training course.[12/] CIATA generally prefers to hire staff with less-than-university-level educations on the grounds that university graduates are more adept at outwitting verification procedures.

Preparation of Reference Map

4.14 Prior to beginning field work, an initial reference map is prepared. The map, showing only street boundaries and other major geographical features, is used to organize subsequent field work and to provide the base for more detailed block maps. The initial map is assembled from existing parcellary maps, subdivision plans, and road and utility maps. Once the temporary staff has been recruited, survey teams then go to the field to verify this information, and sketch and measure streets not identified from existing sources. These are then incorporated on the reference map. The reference map, prepared at a scale of 1:5,000 is then divided into sections, which are expanded to a scale of 1:1,000 and printed on separate sheets.

Field Work

4.15 Property Identification: This phase of the field work has two objectives. The first is to identify each property and assign it an assessment number. For this purpose, the survey team determines only the boundaries of the front footage of each lot. Boundary points are sketched on the section maps, and an assessment number is assigned to each segment of frontage.

4.16 Property Characteristics: The second objective is to gather data on property characteristics, to be subsequently used in calculating individual property valuations. The characteristics of each property are coded on a standard record (see Annex 1). The record lists: (i) the assessment number

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12/ Their fieldwork is verified by having a sample of blocks rechecked. CIATA also uses a template to check property records for implausibilities (for example, a thatched roof on a building reported to have floors of ceramic tile).

and address of the property; (ii) the name and address of the owner or claimant; (iii) data on the physical characteristics of the lot (approximate dimensions, steepness, susceptibility to flooding); and (iv) data on the current use and physical characteristics of the structures (approximate exterior dimensions, and details of external and interior building materials, plumbing and wiring).

Calculation of Unit Costs

4.17 New unit cost tables for land and buildings are then calculated. As is common in Brazil, estimates of the unit value of land are determined for different neighborhoods by a committee, appointed by the mayor, of landowners and real estate agents. These committees do not use evidence from actual market transaction data in any systematic way, but instead rely on their general knowledge of the local real estate market. Unit costs for buildings are based on data published in the Brazilian trade journal *"Revista de Construcao,"* as modified by the CIATA project supervisor. Depreciation tables are also prepared by the project supervisor.

Preparation of Assessment Roll

4.18 Individual property valuations are calculated by applying the unit cost tables to the characteristics of each property. A trial assessment roll is then prepared for the consideration of the mayor. The mayor may, at this time, modify either the unit cost tables or individual valuations as he deems appropriate. (Mayors generally exercise this option.) Once the mayor is satisfied, a final assessment roll is prepared, listing properties by identification number.

Printing of bills

4.19 Based on the assessment roll approved by the mayor, the nominal tax rate and any subsequent inflation adjustments authorized by the municipality, individual property tax bills are then printed and turned over to the municipal treasurer for delivery. Where records are processed manually or in batch, CIATA will also produce a tax roll with space to record payments against each account.

C. Duration, Technology and Scope

4.20 CIATA administrators estimate the duration of a typical project, from mobilization to the printing of bills--at about five months--in a municipality of 5,000 property units. In a municipality of 3,000, a project normally takes three months. At the peak of data gathering, survey teams working in pairs average 15 property units per day. The scope and duration of individual CIATA projects will, however, vary according to preproject conditions. If existing reference maps are adequate, new ones will not be prepared. If existing property records are reliable, the data-gather phase will be relatively short.

4.21 CIATA's use of computers has evolved with changes in computer technology. Early CIATA projects were designed to be administered manually, or in batch on mainframe computers at SERPRO's central computer facilities.

Reliance on centralized computers proved cumbersome, as property records had to be shipped over long distances. This particularly limited the use of CIATA's post-project data processing services for updating tax rolls and issuing annual bills. The advent of mini- and micro-computer technology has permitted CIATA to decentralize data processing. In larger jurisdictions, CIATA now encourages municipalities to purchase their own computers. Smaller jurisdictions are encouraged to share regional computers, through individual terminals linked through telephone lines.

4.22 The decentralization of data processing has enabled CIATA to expand in scope. Under the earlier, centralized mainframe technology, the use of computers to record payments and monitor collection enforcement was impractical. The increasing availability of computers at the municipal level has made the computerization of treasury operations technically feasible, and corresponding technical assistance components are now made available under the CIATA program.

D. Impact

4.23 CIATA's principal objective is to produce a comprehensive valuation of the tax base in each project municipality. In general, a CIATA project would be expected to increase the aggregate value of the tax base. Two separate sources of growth can be distinguished. First, a project would be expected to increase the number of properties on the tax rolls through the discovery of missing properties and expansion of the zone subject to property taxation. Second, it would increase average valuations by producing more accurate information on the physical characteristics of each property and by employing more recent market data to convert property characteristics to estimates of value.

4.24 CIATA clearly has the former impact. CIATA projects consistently and substantially increase the number of properties on the tax rolls. The evidence from a representative sample of CIATA projects is summarized in Tables 5A and 5B. The tables show the results of 241 projects in four project years: 1977, 1978, 1983 and 1984.[13/] For purposes of comparability, projects are divided between those in the less industrialized North/Northeast and those in the rest of Brazil (termed "south" in the following tables).

Projects in 1977 and 1978

4.25 As shown in the first row of Table 5A, CIATA projects undertaken in 1977 and 1978 in northern Brazil increased the number of properties on the tax rolls by an average of 25 percent. In southern Brazil, the impact was even greater. Projects in 1977 doubled the number of properties on the rolls; those in 1978 increased the number of properties by about 50 percent.

13/ Figures for 1977 and 1978 projects are based on 100 percent of observations; figures for 1983 and 1984, on a 33 percent sample. Figures for each project are listed in Annex 3.

Table 5A: RESULTS OF PROJECTS IN 1977 AND 1978

Indicator	1977 North	1977 South	1978 North	1978 South
Percent change in units	26	94	24	51
Revenues per unit (US$)				
preproject	2.97	8.11	4.69	12.46
postproject	4.53	7.47	4.78	12.58
Percent change in revenue				
project	93	78	27	52
control	42	20	29	42

/a Constant US$ of preproject year.
/b In real Terms
/c Control Group consists of all municipalities except state capitals in respective region.

4.26 CIATA's impact on valuations is more difficult to document. Project documents do not identify the level of preproject valuations. The analysis must therefore be based on a comparison of revenues. This is liable to two sources of distortion. First, a municipal government may elect to counteract the effect of increased valuations by lowering the nominal tax rate (or, as is more likely in Brazil, adjusting valuations at less than the rate of inflation). This would decrease the level of billings per property unit. Second, collection efficiency--the proportion of billings actually collected--may decline. Taken together, a lower tax rate and a decline in collection efficiency may cancel the effect on tax revenues of an increase in valuations.[14/]

4.27 This, in fact, appears to be occurring in most CIATA projects. The second and third rows of Table 5A compare revenues per property unit before and after CIATA projects. Among the groups of municipalities on which data are available, only one--northern projects in 1977--show a dramatic increase in revenues per unit. In real terms, revenues per unit in this group increased by an average of 53 percent. Among the other groups--the northern projects in 1978 and the southern projects in both 1977 and 1978--revenues per unit either increased only slightly or declined.

14/ A third factor may also influence the project's impact on tax revenues. If the average value of newly discovered properties is less than the average value of properties already on the tax rolls, the project would result in an overall decline in average valuations.

4.28 The magnitude of the impact of each of these offsetting factors is unclear. Both tax rates--in the form of inflation adjustments--and collection efficiency are volatile enough that either could offset a substantial increase in valuations. Anecdotal evidence suggests that valuations themselves may incorporate a pre-emptive reduction in effective tax rates: CIATA officials report that the unit costs on which valuations are based are often far below market prices.

4.29 The net effect of CIATA projects on tax revenues is shown in the fourth row of Table 5A. Not surprisingly, the rate of increase in revenues is generally proportional to the rate of increase in property units. In the northern projects in 1978, real revenues increased by an average of 27 percent (compared to a 24 percent increase in property units). In the southern projects in 1977 and 1978, real revenues increased by an average of 78 percent and 52 percent, respectively (compared to increases of 94 percent and 51 percent in property units in each group of projects). Only in the northern 1977 projects did revenues increase at a higher rate than property units. Among this group, revenues increase 93 percent in real terms; property units, 26 percent.

Projects in 1983 and 1984

4.30 In the more recent groups of projects--1983 and 1984--tax revenues generally declined in real terms following project implementation. As shown in Table 5B, real revenues declined by 50-55 percent in the northern CIATA projects. Results were better in the south. There, the 1983 projects averaged a real decline in revenue of only 5 percent; 1984 projects experienced an average increase in revenues of 18 percent.

4.31 Data on the number of preproject property units is not available for this group of projects. In assessing the determinants of this performance, it is therefore impossible to distinguish the effect of changes in the number of property units from the combined effect of changing valuations, tax rates and collection efficiency.

4.32 The performance of the 1983 and 1984 CIATA municipalities is, however, consistent with the performance of the property tax throughout Brazil during this period. As noted earlier, the early 1980s was a period of recession and rapid inflation in Brazil. Property tax revenues in the country as a whole declined at an average annual rate of 34 percent between 1980 and 1984. The performance of CIATA municipalities relative to the general trend is mixed. The "control" rows in Table 5B compare the revenue performance of CIATA projects with that of a comparable group of non-CIATA municipalities. As shown, property tax revenues declined in real terms in all the control groups over the relevant period. The rate of decline in CIATA projects in the north was greater than in control groups: revenues in project municipalities declined by 49 percent and 55 percent in the 1983 and 1984 groups, respectively, against a decline of 15 percent and 8 percent in the corresponding control groups. In the south, the reverse occurred. Property tax revenues in the 1983 project municipalities declined by 5 percent (against a control performance of -22 percent) and increased by 18 percent in 1984 projects (against a control performance of -4 percent).

Table 5B: RESULTS OF PROJECTS IN 1983 AND 1984

Indicator	1983 North	1983 South	1984 North	1984 South
Revenues per unit (US$) postproject	0.87	4.61	2.48	2.57
Percent change in revenue				
project	-49	-5	-55	+18
control	-15	-22	-8	-4

E. Costs

4.33 The total cost of a typical CIATA project is estimated to average US$6.50 per property unit. This figure includes the costs of the project supervisor, materials and equipment, data processing and temporary staff.[15/] As shown in Table 6, management, materials and equipment account for the majority of costs--roughly US$5.50 per property unit. Data processing averages 50 cents per property unit; temporary staff, an equivalent amount.

4.34 These costs are fairly high when compared to the level of property tax revenues. When combined with the recurrent cost of administering the property tax--estimated at US$1.55 per property unit[16/]--administrative costs would consume most of the revenue generated by the property tax for several years following project completion. Among northern projects completed in 1977, for example, only 64 percent would be generating a positive cash flow

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15/ Costs of data processing are based on processing in batch at a CIATA regional office.

16/ The estimates of recurrent costs include the salaries of the municipal assessor, 20 percent of the municipal treasurer's salary, CIATA's recurrent maintenance charge and postage. Together these recurrent costs average US$1.55 per property.

Table 6: CIATA PROJECT COSTS
(US$)

Component	Typical Project	Per Property	Percent of Total
Supervisor, materials	27,500	5.50	85
Data processing	2,500	0.50	8
Temp. staff	2,500	0.50	8
TOTAL	32,500	6.50	100

after three years; of those completed in 1978, only 37 percent would show a positive cash flow after three years. The breakeven point arrives earlier in southern projects, where average revenues are higher: roughly 95 percent of projects would generate a positive cash flow after three years. The 1983 and 1984 southern projects show pay back periods similar to earlier northern projects, however. Only 38 percent of southern projects completed in 1983, and only 29 percent of projects completed in 1984, break even after three years. (The equivalent figures for northern projects are 0 percent and 5 percent, respectively.) As discussed in the concluding section, these results suggest the need for greater selectivity in the choice of participating municipalities.

V. GENERALIZABLE LESSONS

5.01 Brazil's experience with urban property taxation yields generalizable lessons on both the practice of property tax administration and the process of implementing administrative reforms.

A. Improving Administrative Procedures

5.02 Virtually all developing countries present a similar set of challenges to the administration of the property tax. The effectiveness of administrative procedures in responding to these problems determines how well the property tax performs. (For a summary of these common problems, and Brazil's response to them, see Box 2.)

SUMMARY OF PROCEDURAL SOLUTIONS

Problem	Brazilian Response
Rapid urban growth	- Cross-referencing - Voluntary compliance - Ongoing field surveys - Episodic general surveys
Scarce skills	- Simple valuation method - CIATA technical assistance
Inaccessible market data	- Use of construction data - Land value "commissions"
Inflation	- Indexed valuations
Disputed liability	- Broad definition of liability
Slow judicial processes	- Tax clearances

Box 2

Rapid Urban Growth

5.03 In a rapidly growing city, a one-time survey of parcels and property characteristics is obsolete as soon as it is completed. Property tax procedures must be capable of discovering and incorporating new construction onto the tax rolls on an ongoing basis.

5.04 In Brazil, municipalities employ four techniques to obtain updated information on property characteristics: cross-referencing, voluntary compliance, ongoing field surveys and episodic general resurveys. The tax-clearance form of cross-referencing appears to be effective under certain

conditions: when imposed as a condition of granting an occupancy permit (to flag new construction) or registering a deed of sale (to flag changes in ownership, including new subdivisions). It would presumably be as effective in other countries, provided the process of property transfer and development employed similar systems of approval and registration. Cross-referencing, in the form of voluntary information-sharing among agencies of government, does not have a good track record in Brazil. Experience with voluntary compliance is similarly mixed.

5.05 Episodic general resurveys, as practiced in Brazil, are a response to the failure of other techniques to provide updated property information. As a maintenance technique, they imply the acceptance of a high level of evasion prior to the general resurvey. Rio's experience suggests that general resurveys can be undertaken at relatively low unit-cost, but at the expense of continued omissions and distortions in the tax base. CIATA's experience suggests that comprehensive general resurveys are not cost-effective if they are relied upon as the sole method of obtaining updated property information.

Scarcity of Skills

5.06 The task of converting visible property characteristics to an estimate of market value is one that potentially requires a sophisticated knowledge of property markets and leaves considerable discretion to individual property valuers. Local governments in many developing countries have difficulty attracting such staff and have found that discretion invites corruption.

5.07 Brazil's response is to use a highly simplified form of mass appraisal to derive the majority of property valuations. In this respect, it is successful. The technique is based upon a few readily observable, measurable characteristics of each property. No skills, other than the ability to measure and write, are required of the valuer in the field. His work is readily verifiable through remeasurement of randomly selected properties.

5.08 The technique does require a degree of professional judgement in the initial calculation of unit costs. Here, CIATA appears to be a successful response, particularly in smaller jurisdictions where the need is most critical. CIATA maintains a centralized pool of expertise, which is available to municipalities at the time unit costs are recalculated.

Inaccessible Market Information

5.09 Accurate data on market prices are also essential to the production of defensible valuations. They are rarely available through official sources. In countries defining value in capital or sales terms, data on transactions are understated to avoid real estate transfer taxes. In countries defining value in rental terms, a similar problem exists. Many of these countries impose rent controls. As these controls are often ignored or subverted in the market, data on actual--and therefore illegal--rents are not available to official sources.

5.10 Brazil has a workable approach to the calculation of unit costs for buildings: the municipalities use construction cost data derived from industry sources. Brazil has not found an acceptable means of calculating the unit cost

of land. While the required knowledge may reside with real estate brokers, their presence on valuation commissions does not bring it to the fore. Land therefore continues to be arbitrarily valued in Brazil.

Inflation

5.11 In any country with significant inflation, existing valuations rapidly become obsolete, along with the unit costs used to value new construction. The buoyancy of tax revenues cannot be maintained without regularly adjusting valuations and unit costs or compensatory increases in the nominal tax rate.

5.12 Brazil has coped successfully with inflation. This success is largely attributable to the federal legislation which permits municipalities to make annual adjustments in valuations without physical reinspections of properties. The recent instability in inflation rates has proven more challenging, as municipalities generally calculate tax liabilities in nominal terms before the beginning of the tax year, and taxpayers are permitted to pay in installments. Rio's decision to assess taxes in terms of treasury bill units appears to be a successful, though cumbersome, response to this problem.

Disputed Liability

5.13 Collection enforcement depends upon the ability of government to identify the person liable for paying the tax. While property is visible and easily defined, tax liability is not. Records of ownership or tenancy agreements may be inaccessible to the taxing authority. If liability is narrowly defined and the burden of proving liability is placed on the taxing authority, collection enforcement is made unnecessarily difficult.

5.14 Brazil defines liability as ownership, but defines ownership broadly. Liability effectively extends to any person in beneficial occupation of the property. In employing this broad definition, the municipalities are successfully relieved of any legal obligation to prove legal ownership before imposing the tax.

Slow and Expensive Judicial Processes

5.15 Enforcement also depends upon the government's ability to impose penalties swiftly and consistently. The judicial processes for collecting civil debts are often slow and expensive in developing countries. Administrative enforcement mechanisms can exploit the government's role as a provider of public services, granter of permits and recorder or guarantor of property ownership to give the taxing authority leverage over delinquent taxpayers.

5.16 Collection enforcement in Brazil continues to be a problem. Brazilian municipalities have attempted to use a variety of administrative mechanisms to enforce collections. Only one--a tax clearance for deed registration--is consistently effective, and its use is limited: taxpayers who have no intention of transferring titles are unaffected.

B. Lessons for the Design of Technical Assistance Programs

5.17 Brazil's experience in attempting to improve property tax administration--exemplified by the CIATA and Rio cases--yields several generalizable lessons.

Method of Delivery

5.18 CIATA's method of delivery is clearly an effective means of providing technical assistance on a mass scale. Three characteristics of the program are critical in this respect:

- Prepackaging: CIATA is delivered as a standardized package. The program provides proforma bylaws, forms and procedures manuals and follows essentially the same sequence of steps in each project municipality. As a result, no time is lost reinventing available materials, and new projects can benefit from the experience gained in previous projects.

- Permanent staff: The use of a permanent CIATA staff ensures that projects are directed by experienced managers who, again, benefit from experience gained in prior projects.

- Collaborative roles for CIATA and local staff: CIATA provides its technical assistance in the form of a project manager who directs the implementation of projects using staff of the assessor's office and locally hired interns. This approach is clearly more effective than the alternative methods of delivering technical assistance. The diagnostic/prescriptive mode--yielding recommendations to be executed by the municipality--would not exploit the implementation experience of prior CIATA projects. The execution mode--where projects would be executed entirely by CIATA staff with the finished product (maps, property records, and bills) turned over to the municipality on completion--would have little chance of achieving a sustained impact. Direct involvement of the assessor appears to be critical to the transfer of knowledge needed to maintain the system.

Scope

5.19 While CIATA consistently results in an increase in total valuations, its impact on actual revenues is mixed. Increases in valuations are often offset by reductions in effective tax rates or by declining collection efficiency. Even where tax revenues rise substantially, the absolute level of property taxes remains low.

5.20 It can be argued that CIATA's failure to increase tax revenues is partly due to its narrow scope. The program's original objective was to produce a comprehensive valuation of the tax base. Until recently, it did not address collection procedures (though this has since been remedied by the inclusion of a collection monitoring component in the project).

5.21 A too narrow scope, however, only partly explains CIATA's limited impact. Anecdotal evidence suggests that declining collection enforcement was an intentional response to subsequent political pressure. And reductions in effective tax rates--another cause of CIATA's limited impact on revenues--clearly reflects deliberate policy.

Changing Political Incentives?

5.22 The tendency of local officials to counteract CIATA's impact on valuations reflects the political incentives governing the use of the property tax in Brazil. As described earlier, formula-based intergovernmental transfers are the primary source of municipal revenue in Brazil. The 10 shared taxes effectively finance a minimum level of municipal expenditure in each jurisdiction. The role of the property tax in financing local government is limited: along with a local services tax, it serves only as a means of enabling local governments to make marginal increases in municipal expenditure in accordance with local preferences.

5.23 Judging from the level of property taxation in Brazil, taxpayers have not expressed a preference for increasing the level of municipal expenditure--at least if it requires an increase in local taxes. This presumably reflects some scepticism over the value-for-money generated by municipal expenditure. It also reflects a recognition that alternative external sources of funds are available. Due to the ambiguous division of functions among levels of government in Brazil, ad hoc support, in cash or kind, can be sought from the state and central governments.

5.24 Should the structure of intergovernmental transfers be changed to encourage increases in local taxation? Not necessarily. A high level of municipal expenditure is not an end in itself. If the existing level of property taxation in fact reflects taxpayers' assessment of the merits of additional municipal expenditure, Government should not attempt to distort it.

5.25 There is, however, a case for removing any existing disincentives against local taxation and providing taxpayers with an unbiased basis on which to judge the case for an increase in local expenditure. One step in this direction would be to define the functional responsibilities of local governments more precisely in order to establish more clearly the link between the level of local taxes and the output of local government.

Selection Criteria

5.26 Should CIATA projects be discontinued in jurisdictions unwilling to make complementary changes in tax policy? Again, not necessarily. CIATA's limited revenue impact does not negate the case for the program. It succeeds in improving the fairness with which the burden of the property tax is distributed even if it does not necessarily result in an increase in revenues. But it raises a final issue for the design on such programs: under what circumstances are investments in improved tax administration worth undertaking?

5.27 The question is difficult to answer in precise terms. While the costs of such programs are readily quantified, the benefits are not. There are several reasons.

5.28 First, the benefits of an increase in fairness alone cannot be quantified in any meaningful way.

5.29 Second, the benefits of an increase in tax revenues can only be approximated. Revenues themselves are a poor proxy for benefits: as taxes are merely a transfer of resources from the private to the public sector, the gain in benefits from increased public expenditure must be offset--wholly or partly--by the loss in benefits from reduced private expenditure. It is only this net benefit that must justify the costs of tax administration.

5.30 Finally, the causal relationship between an improvement in tax administration and increases in revenue is complex. The quality of tax administration clearly affects the level of revenues generated from a particular tax. Any effort to increase the tax rate on a badly administered tax base exaggerates existing inequities and carries potentially adverse political costs. But as the CIATA case illustrates, a given increase in property discoveries does not necessarily generate an equivalent increase in revenues.

5.31 It is clear, nevertheless that tax administration projects should not be undertaken where they would be unprofitable, in financial terms, from the perspective of the public sector as a whole. A tax whose revenues do not exceed its administrative costs generates no net revenues and therefore generates no benefits. Government resources should not be invested in projects which do not generate benefits.

5.32 Profitability, however, represents a subminimum standard. A tax that breaks even from a financial standpoint is still a money-losing proposition in economic terms. If a tax's administrative costs consume too large a proportion of its gross revenues in a large number of municipalities,[17/] then consideration should be given to altering the system of local finance as a whole. Brazil for example might consider abolishing either the property tax or the services tax. Both perform an identical role: that of permitting local discretion over the level of municipal expenditure. A single tax instrument can do the job equally well, while eliminating the costs of administering the second tax.

17/ This is often expressed in terms of an administrative cost ratio, measured as the ratio of administrative cost to gross revenues. An administrative cost ratio of 100 percent would represent, in financial terms, a tax's breakeven point. While the standard for administrative cost ratios varies among taxes, ratios of less than 10 percent may be considered an appropriate target. The typical administrative cost ratio for the property tax in the United States, for example, averages about 1 percent (excluding costs of billing).

CIATA Property Data Form (Page 1)

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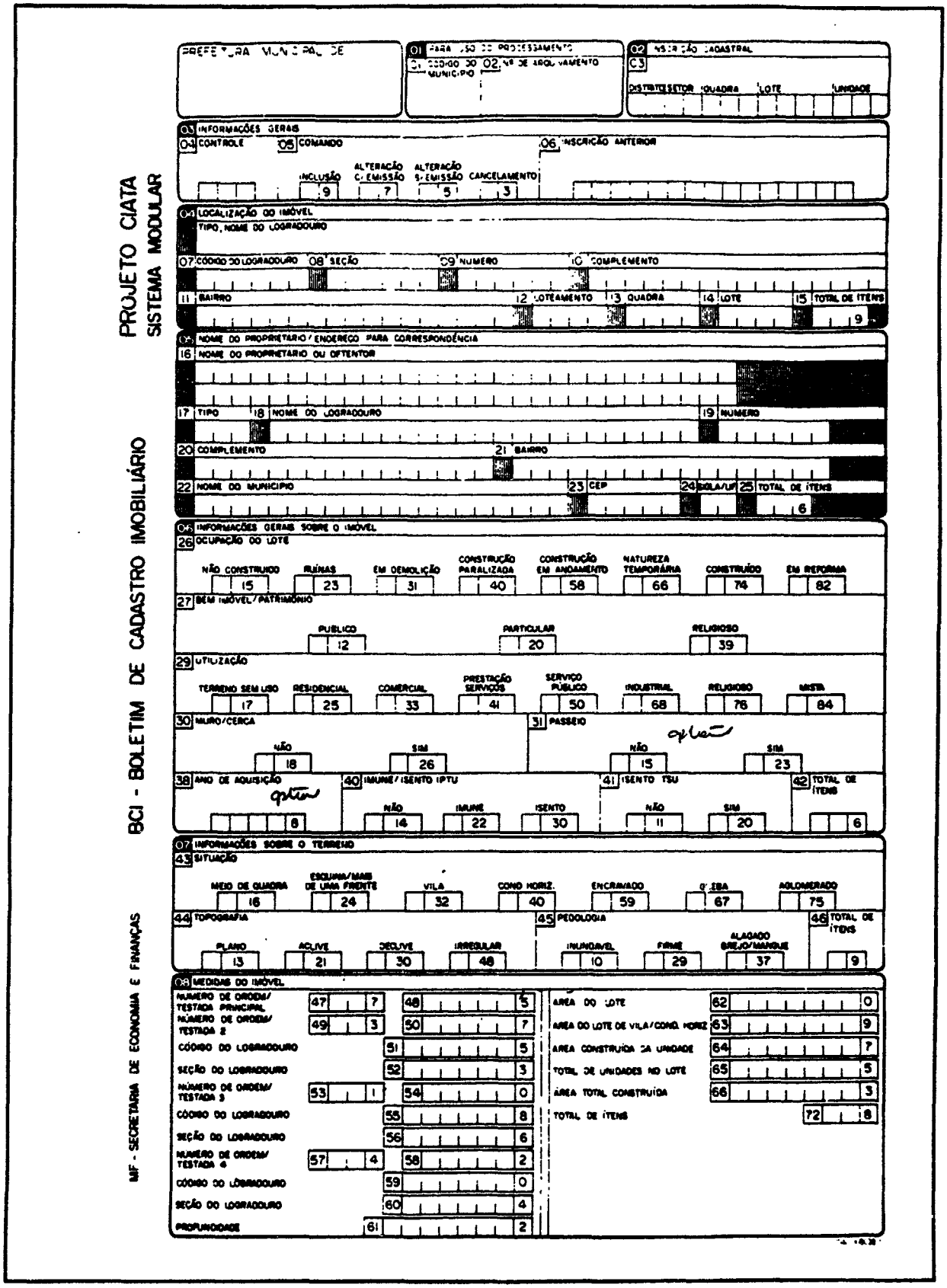

CIATA Property Data Form (Page 2)

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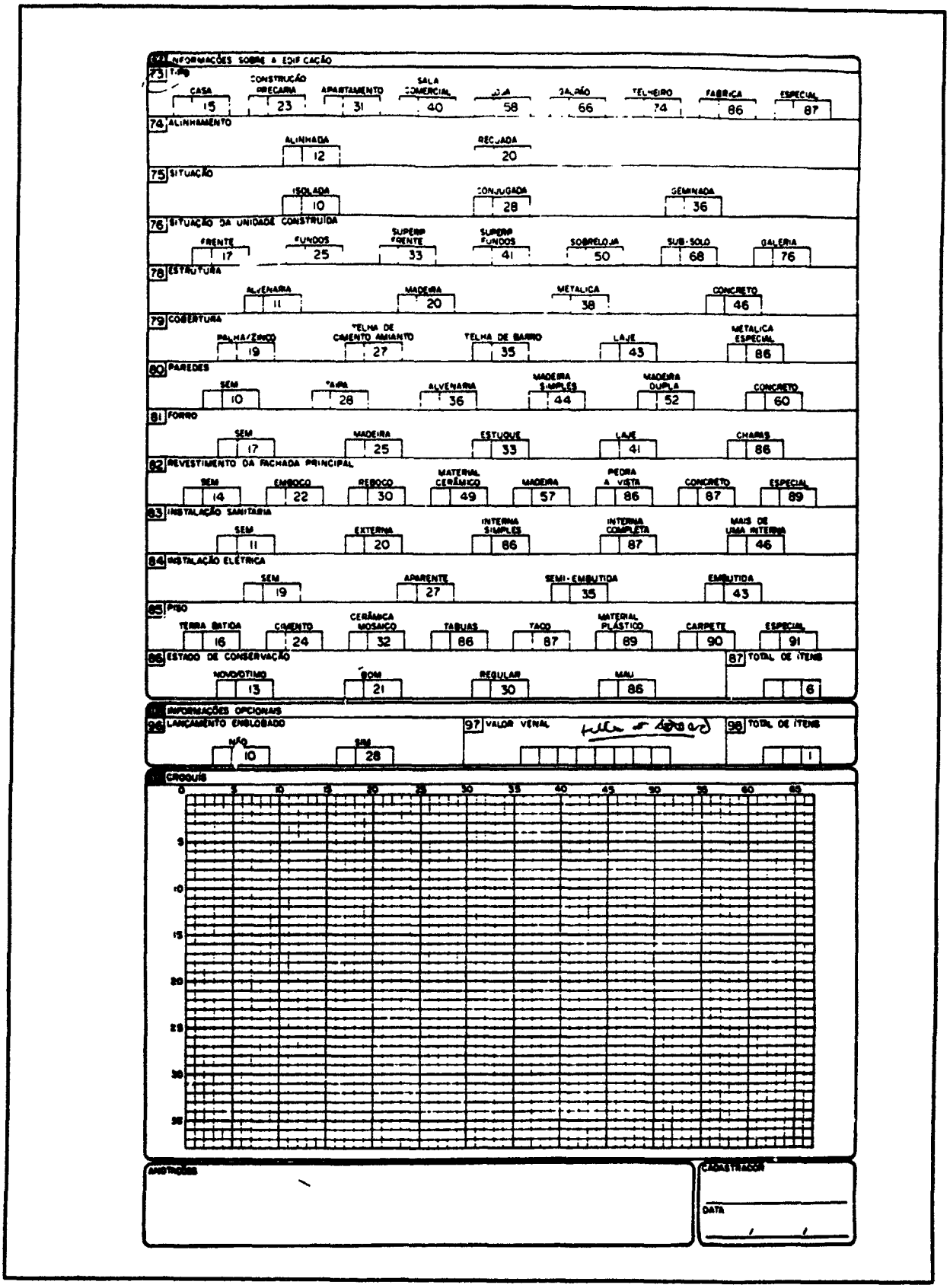

CIATA Program Results for Individual Projects

MUNICIPIO STAT	CHANGE IN	REVENUES PER UNIT		PERCENT CHANGE IN REVENUES	
Projects in 1977	UNITS	PRE-PROJ	PROJECT	PROJECT	PLUS 5 YEARS
JACIARA MT	1%	$1.17	$1.79	54%	7%
BARBALHA CE	50%	$7.79	$7.24	40%	-29%
BREJO SANTO CE					
CRATO CE	3%	$2.34	$10.34	355%	-35%
ICO CE	21%	$4.56	$4.73	26%	-24%
IPU CE	19%	$1.46	$3.02	146%	-19%
JOAZEIRO DO N. CE	24%	$1.49	$3.77	215%	-30%
MORADA NOVA CE	19%	$1.26	$3.03	184%	-23%
SAO BENEDITO CE	90%	$0.68	$5.26	1380%	-27%
UBAJARA CE	48%	$0.79	$5.24	877%	-26%
VICOSA DO CEARA CE					
AGUA BRANCA PI					
BATALHA PI	168%	$5.45	$3.73	84%	-26%
CASTELO DE PIAUI					
ESPARANTINA PI	-15%	$0.98	$3.66	236%	-35%
ELESBAO VELOSO PI	0%	$0.41	$1.55	279%	-62%
JOSE DE FREITAS PI	-2%	$1.58	$3.79	134%	-21%
PEDRO SEGUNDO PI					
VALENCA PI	240%	$3.95	$3.90	236%	-25%
SIMPLICIO MENDES PI	51%	$2.21	$3.08	110%	-38%
GOIANA PE	50%	$1.06	$4.34	513%	-14%
LIMOEIRO PE	-18%	$4.59	$5.18	-8%	-17%
MACAPARANA PE	34%	$0.73	$3.21	487%	-31%
PALMARES PE	28%	$3.35	$2.77	6%	-31%
ATALAIA AL	18%	$2.26	$3.15	64%	-29%
BARRA STO ANTONIO AL	54%	$4.02	$6.02	131%	-38%
DOIS RIACHOS AL	4%	$0.69	$3.27	391%	-30%
MAJOR ISIDORO AL					
S LUIS QUITENDE AL	1073%	$14.02	$4.89	309%	-30%
CAJAZEIROS PB					
ESPERANCA PB	15%	$3.88	$4.73	40%	-34%
ITABAIANA PB	11%	$3.15	$3.51	24%	-19%
RIO TINTO PB	29%	$8.09	$9.24	48%	-28%
SAPE PB	109%	$2.59	$3.94	218%	-23%
LAURO FREITAS BA	143%	$7.75	$2.62	-16%	14%
S ANTONIO JESUS	54%	$4.02	$6.02	131%	-15%
BOA ESPERANCA MG	100%	$11.45	$10.86	89%	-29%
CAXAMBU MG					
CORINTO MG	26%	$8.92	$15.85	124%	-34%
ITABIRITO MG	66%	$5.91	$13.67	285%	-25%
LAGOA DA PRATA MG	34%	$6.89	$5.92	15%	-16%
OLIVEIRA MG	-8%	$8.20	$13.65	53%	-17%
BOM JARDIM RJ	42%	$6.16	$15.17	250%	-23%
CACHOEIRO MACAU RJ	15%	$5.36	$7.43	59%	-17%
PIRAI RJ	86%	$20.49	$10.27	-6%	-10%
PORCIUNCULA RJ	27%	$19.50	$16.05	4%	-17%
ARACRUZ ES	326%	$21.76	$8.18	60%	-21%
BAIXO GUANDU ES	35%	$6.08	$7.95	77%	-11%
BARRA SAO FRANCISCO ES	38%	$4.76	$10.34	199%	-25%
CONCEICAO BARRA ES	228%	$4.22	$8.30	545%	-31%
IUNA ES	33%	$3.90	$9.92	240%	-31%
SERRA ES	221%	$5.57	$3.75	116%	4%
JAGUARUNA SC	3162%	$5.97	$0.57	213%	-3%
JOACABA SC	-34%	$12.77	$17.77	-9%	-14%
SAO JOSE SC	6%	$4.57	$13.23	208%	-3%
SAO MIGUEL SC	80%	$39.14	$27.62	27%	-20%
UNWEIGHTED AVERAGES					
NORTHEAST	83%	$3.40	$4.48	237%	($0.27)
REST OF BRAZIL	236%	$10.61	$11.40	134%	-18%
WEIGHTED AVERAGES					
NORTHEAST	26%	$2.97	$4.53	93%	-18%
REST OF BRAZIL	94%	$8.11	$7.47	78%	-11%
N OF OBSERVATIONS		48			
NORTHEAST		28			
REST OF BRAZIL		20			

MUNICIPIO	STAT	CHANGE IN UNITS	REVENUES PER UNIT		PERCENT CHANGE IN REVENUES	
Projects in 1978			PRE-PROJ	PROJECT	PROJECT	PLUS 5 YEARS
Abaetetuba	PA	52%	$11.36	$5.98	-20%	-35%
Braganca	PA	38%	$1.43	$3.63	251%	-16%
Capanema	PA	20%	$3.16	$2.98	13%	-15%
Maraba	PA	70%	$6.06	$4.20	18%	0%
Santarem	PA	113%	$11.55	$6.35	17%	8%
Tucurui	PA	-7%	$3.79	$5.98	47%	-33%
Itacoatiara	AM	13%	$5.68	$2.49	-50%	-30%
Manacapuru	AM	669%	$14.05	$3.25	78%	-16%
Aracati	CE	35%	$1.44	$3.43	222%	-23%
Caninde	CE	4%	$0.47	$2.61	476%	-22%
Cascavel	CE	65%	$3.16	$4.38	126%	-1%
Cedro	CE	-5%	$1.32	$2.41	73%	-22%
Limoeiro do Norte	CE	136%	$4.87	$3.49	69%	-16%
Monbaca	CE	27%	$1.21	$2.84	199%	-26%
Petencostes	CE	168%	$5.18	$2.34	21%	-80%
Quixada	CE	18%	$3.55	$2.21	-26%	-36%
Tiangua	CE	11%	$0.09	$1.78	2202%	-27%
Floriano	PI	-21%	$1.50	$3.61	90%	-21%
Guadalupe	PI	321%	$0.50	$2.71	2166%	-46%
Parnaiba	PI	41%	$4.98	$2.68	-24%	-23%
Picos	PI	110%	$4.86	$2.66	15%	-16%
Barreiros	PE	-41%	$1.87	$5.43	73%	-30%
Gravata	PE	16%	$1.14	$3.41	247%	-12%
Itambe	PE	9%	$3.62	$0.40	-88%	29%
Rio Formoso	PE	350%	$25.22	$12.67	126%	-24%
Salgueiro	PE	73%	$4.60	$3.08	15%	-11%
Surubim	PE	112%	$2.17	$4.44	334%	-28%
Vitoria de S. Antao	PE	-11%	$3.93	$10.23	133%	-20%
Petrolina	PE	3%	$10.75	$10.57	1%	-7%
Palmeira dos Indios	AL	12%	$6.81	$7.44	22%	-39%
Pao de Acucar	AL	32%	$7.66	$4.53	-22%	-38%
Porto Calvo	AL	14%	$0.38	$2.77	731%	-32%
Pilar	AL	-10%	$0.82	$4.94	446%	-33%
S.Jose da Laje	AL	-15%	$0.89	$2.58	147%	-38%
Mari	PB	-3%	$0.26	$2.12	683%	-14%
Monteiro	PB	59%	$3.42	$2.09	-3%	-22%
Padras de Fogo	PB	24%	$2.00	$4.41	175%	2%
Taixeira	PB	5%	$0.94	$1.04	16%	-39%
Alacoinhas	BA	18%	$9.03	$9.57	25%	-23%
Cachoeira	BA	-2%	$2.74	$3.95	41%	-21%
Candeias	BA	49%	$4.29	$4.30	49%	-8%
Juazeiro	BA	89%	$5.98	$1.87	-41%	-5%
S.Felix	BA	17%	$3.91	$2.63	-21%	-21%
Vera Cruz	BA	20%	$5.21	$1.14	-74%	20%
Lagarto	SE	27%	$4.94	$3.09	-21%	-30%
Tobias Barreto	SE	47%	$2.93	$3.52	77%	-8%
Alem Pariba	MG	3%	$11.52	$20.09	80%	-23%
Caldas	MG	3%	$9.55	$13.92	50%	-33%
Guaranesia	MG	56%	$12.09	$18.71	141%	-21%
Guaxupe	MG	38%	$17.70	$21.56	68%	-14%
Ibia	MG	5%	$6.41	$6.83	12%	-28%
Ouro Fino	MG	30%	$18.91	$21.46	47%	-33%
Ponte Nova	MG	-9%	$6.00	$20.95	216%	-28%
S.Antonio do Monte	MG	28%	$4.07	$6.66	109%	-11%
S.Dumont	MG	16%	$8.40	$13.88	92%	-26%
S.Sebastiao do Para	MG	40%	$30.28	$20.14	-7%	-22%

Afonso Claudio	ES	88%	$13.95	$7.18	-3%	-8%
Anchieta	ES	86%	$2.80	$1.97	31%	-19%
Colatina	ES	30%	$9.74	$12.45	66%	-23%
Fundao	ES	263%	$4.71	$1.69	30%	-12%
Guacui	ES	43%	$5.77	$9.79	143%	-27%
Ibiracu	ES	49%	$6.38	$7.75	81%	-30%
Mimoso do Sul	ES	73%	$8.70	$12.83	155%	-32%
S.Gabriel da Palha	ES	19%	$5.01	$11.78	179%	-31%
Bom Jesus do Itabapo	RJ	9%	$7.01	$18.73	190%	-26%
Casbuci	RJ	41%	$12.29	$9.78	12%	-29%
Cantagalo	RJ	84%	$9.78	$11.80	122%	-36%
Cordeiro	RJ	19%	$4.63	$19.33	397%	-37%
Mendes	RJ	93%	$9.72	$14.09	180%	-34%
Natividade	RJ	66%	$7.45	$9.81	119%	-25%
S.Fidelis	RJ	21%	$6.61	$13.25	143%	-26%
S.Joao da Barra	RJ	110%	$3.41	$2.98	83%	-10%
Saquarema	RJ	63%	$3.20	$8.74	344%	-7%
Silva Jardim	RJ	396%	$6.66	$3.73	178%	-21%
Bananal	SP	1%	$4.65	$12.40	169%	-16%
Casa Branca	SP	19%	$23.85	$20.39	2%	-11%
Jacupiranga	SP	249%	$21.50	$8.82	43%	-18%
Mirassol	SP	-6%	$17.11	$3.94	-78%	39%
Queluz	SP	55%	$11.61	$15.40	106%	-44%
Taquaritinga	SP	23%	$54.54	$34.04	-23%	-21%
Brusque	SC	25%	$11.98	$12.26	28%	-21%
Cacador	SC	105%	$13.98	$14.87	116%	-77%
Herval D'Oeste	SC	48%	$8.24	$8.24	48%	-14%
Ibirama	SC	29%	$14.80	$13.78	20%	-14%
Laguna	SC	397%	$12.23	$7.85	219%	-10%
Palmitos	SC	94%	$13.96	$13.40	86%	-20%
Taio	SC	13%	$8.98	$13.80	74%	-17%
Bento Goncalves	RS	169%	$32.96	$15.93	30%	-11%
Carlos Babosa	RS	37%	$7.32	$9.24	73%	-9%
Getulio Vargas	RS	-39%	$8.98	$17.44	18%	-18%
Lavras do Sul	RS	-32%	$4.20	$10.73	73%	-17%
Nova Prata	RS	5%	$13.44	$47.53	270%	-32%
S.Antonio da Patrulh	RS	31%	$10.64	$21.66	167%	-17%
S.Marcos	RS	-5%	$14.62	$26.06	70%	-7%
Chapada dos Guimaraes	MT	16%	$1.26	$7.49	592%	-33%
Tangara Da Serra	MT	-22%	$1.38	$6.82	263%	-5%
Anambai	MS	6%	$6.05	$7.05	24%	-15%
UNWEIGHTED AVERAGES						
NORTHEAST		60%	$4.47	$4.00	196%	-21%
REST OF BRAZIL		58%	$11.20	$13.55	111%	-21%
WEIGHTED AVERAGES						
NORTHEAST		24%	$4.69	$4.78	27%	-16%
REST OF BRAZIL		51%	$12.46	$12.58	52%	-18%
N OF OBSERVATIONS						
NORTHEAST			46			
REST OF BRAZIL			51			

MUNICIPIO		REVENUES PER UNIT		PERCENT CHANGE IN REVENUES	
Projects in 1983		PRE-PROJ	PROJECT	PROJEC	PLUS 1 YR
COQUEIRO SECO	AL	NA	$0.77	-55%	-72%
ARAPIRACA	AL				
CANARANA	BA				
INHAMBUPE	BA	NA	$1.99	-37%	-53%
JUSSARA	BA	NA	$0.70	-59%	9%
CENTRAL	BA				
BARRA DOS MENDES	BA	NA	$0.88	13%	27%
XIXUE XIQUE	BA	NA	$1.45	-77%	-12%
HIDROLANDIA	CE	NA	$1.39	-12%	-12%
PIQUET CARNEIRO	CE	NA	$0.87	-19%	-25%
COLINAS	MA	NA	$1.84	-23%	-55%
JUSCINEIRA	PA	NA	$0.92	-41%	-38%
ITAITUBA	PA	NA	$3.53	125%	-75%
SANTO ANTONIO TAUA	PA	NA	$1.92	-48%	-96%
MULUNGU	PB	NA	$0.26	-39%	-7%
POCINHOS	PB	NA	$0.65	52%	-59%
PIO IX	PI	NA	$1.02	-37%	-39%
UPANEMA	RN	NA	$0.18	7%	-45%
POCO BRANCO	RN	NA	$0.33	76%	-25%
CACOAL	RO				
CARACARI	RR	NA	$2.30	-45%	-36%
SAO CRISTOVAO	SE	NA	$0.08	-77%	-3%
RIFAINA	SP	NA	$1.82	-62%	-34%
GUAPIACU	SP	NA	$4.71	-32%	-20%
URANIA	SP	NA	$3.14	-53%	22%
LUISIANA	SP	NA	$1.03	-18%	-12%
PEDRANOPOLIS	SP	NA	$3.60	-11%	-37%
LAVINIA	SP	NA	$5.50	-41%	-48%
NHANDEARA	SP	NA	$10.23	-20%	-2%
TRES FRONTEIRAS	SP	NA	$4.57	57%	-17%
ESTRELA DOESTE	SP	NA	$11.00	-31%	-36%
MPIRPORA	GO				
NARZAGAO	GO	NA	$1.53	-35%	-58%
PETROLINA DE GOIAS	GO	NA	$1.08	299%	-10%
FAZENDA NOVA	GO	NA	$1.02	-45%	-81%
CASHOEIRA DE GOIAS	GO	NA	$5.12	-26%	-84%
CORREGO DE OURO	GO				
PRESIDENTE KENNEDY	GO				
SACRELANDIA	GO	NA	$1.81	0%	-24%
SETE QUEDAS	MS	NA	$1.53	-14%	-41%
SAO GABRIEL DOESTE	MS				
COSTA RICA	MS	NA	$1.85	49%	-49%
CANAPUA	MS	NA	$1.22	-45%	86%
QUATRO MARCOS	MS	NA	$2.14	-14%	22%
DIAMANTINO	MT	NA	$1.40	-9%	236%
RIO BRANCO	MT	NA	$0.21	-6%	-35%
CAMBIRA	PR	NA	$3.25	56%	-33%
INACIO MARTINA	PR	NA	$3.73	-60%	-7%
PAULO FRONTIN	PR	NA	$0.81	-61%	21%
SAO MATEUS DO SUL	PR	NA	$4.38	69%	4%
MANGUERINHA	PR	NA	$1.75	-20%	16%
JESUITAS	PR				
BRAGA NEI	PR				
CORONEL BICACO	RS	NA	$5.51	120%	-5%
JAGUARAO	RS	NA	$5.31	-21%	-20%
SANTO CRISTO	RS	NA	$11.72	-22%	-30%
QUILOMBO	SC	NA	$2.01	-20%	20%
ALFREDO WAGNER	SC	NA	$3.07	-23%	-12%
PIRATUBA	SC	NA	$4.94	-26%	-22%
PRESIDENTE CASTELO B	SC	NA	$3.43	-47%	-23%
TUBARAO	SC	NA	$8.27	4%	-26%
PERITIBA	SC	NA	$2.61	16%	-32%
UNWEIGHTED AVERAGES					
NORTHEAST		NA	$1.17	-17%	-34%
REST OF BRAZIL		NA	$3.69	-3%	-11%
WEIGHTED AVERAGES					
NORTHEAST			$0.87	-49%	-41%
REST OF BRAZIL			$4.81	-5%	-17%
N OF OBSERVATIONS					
NORTHEAST		18			
REST OF BRAZIL		34			

Projects in 1984		REVENUES PER UNIT		PERCENT CHANGE IN REVENUES	
		PRE-PROJ	PROJECT	PRE-PROJ	PROJECT
Brasileia	AC	NA	$1.43	-33%	-1%
Cha Preta	AL				
Jacare dos Homens	AL	NA	$0.71	-15%	-28%
Uniao dos Palmares	AL	NA	$0.35	32%	-47%
Itajuipe	BA	NA	$1.27	95%	24%
Monte Santo	BA	NA	$1.31	66%	-14%
Rui Barbosa	BA	NA	$0.67	-41%	-30%
Santa Cruz Cabralia	BA	NA	$0.73	2%	35%
Assare	CE	NA	$3.31	-17%	279%
Caririacu	CE	NA	$0.00	-37%	-95%
Guaramiranga	CE				
Mulungu	CE				
Pedra Branca	CE	NA	$0.41	-65%	-36%
S.Joao do Jaguaribe	CE	NA	$0.77	-84%	647%
Carira	SE				
Riachoa do Dantas	SE	NA	$0.02	-28%	-55%
Vigia	PA	NA	$2.56	24%	601%
Fagundes	PB	NA	$0.01	-31%	-96%
Alagoa Nova	PB	NA	$0.21	23%	-45%
Taperoa	PB	NA	$0.03	-24%	-89%
Lagoa Seca	PB	NA	$0.25	-20%	-30%
Camocim S. Felix	PE	NA	$0.69	-54%	120%
Gloria do Goita	PE	NA	$0.47	-2%	-17%
Padra	PE				
Vicencia	PE	NA	$0.81	-4%	250%
Luis Correia	PI	NA	$0.01	342%	-81%
Lagoa de Pedras	RN				
Sao Rafael	RN				
Porto Velho	RO	NA	$6.73	50%	-61%
Bom Jardim	MA				
Rosario	MA				
Bom Despacho	MG	NA	$1.68	-26%	-30%
Centralina	MG				
Delfinopolis	MG	NA	$1.16	-37%	87%
Manhuacu	MG	NA	$1.81	-37%	84%
Rio Pardo de Minas	MG	NA	$0.38	-63%	95%
S.Bento Abade	MG	NA	$1.17	167%	14%
Visconde do Rio Gran	MG	NA	$2.42	-32%	76%
Nobres	MT	NA	$8.27	240%	181%
Pontes e Lacerda	MT				
Vila Bela Santissima	MT	NA	$1.39	13%	9%
Vera Cruz do Oeste	PR				
Congonhinhas	PR	NA	$6.17	61%	97%
Jaguariaiva	PR	NA	$2.83	77%	-3%
Matelandia	PR	NA	$2.36	-31%	0%
S.Jorge do Patrocini	PR				
Tapira	PR	NA	$1.40	76%	-6%
Feliz	RS	NA	$9.84	-26%	3%
Nova Bassano	RS	NA	$5.94	-26%	44%
Correa Pinto	SC				
Ponte Alta	SC	NA	$3.29	-14%	9%
Barra Bonita	SP	NA	$2.46	-8%	3%
Nuporanga	SP	NA	$9.55	-11%	-3%
S.Bento do Sapucai	SP	NA	$4.64	-35%	89%
Barro Alto	GO	NA	$0.91	43%	68%
Pilar de Goias	GO				
Quirinopolis	GO	NA	$2.48	-49%	104%
Cacu	GO	NA	$2.39	-35%	-24%
UNWEIGHTED AVERAGES					
NORTHEAST		NA	$1.43	8%	56%
REST OF BRAZIL		NA	$3.98	12%	43%
WEIGHTED AVERAGES					
NORTHEAST			$2.48	44%	-55%
REST OF BRAZIL			$2.57	-12%	18%
N OF OBSERVATIONS					
NORTHEAST		19			
REST OF BRAZIL		21			